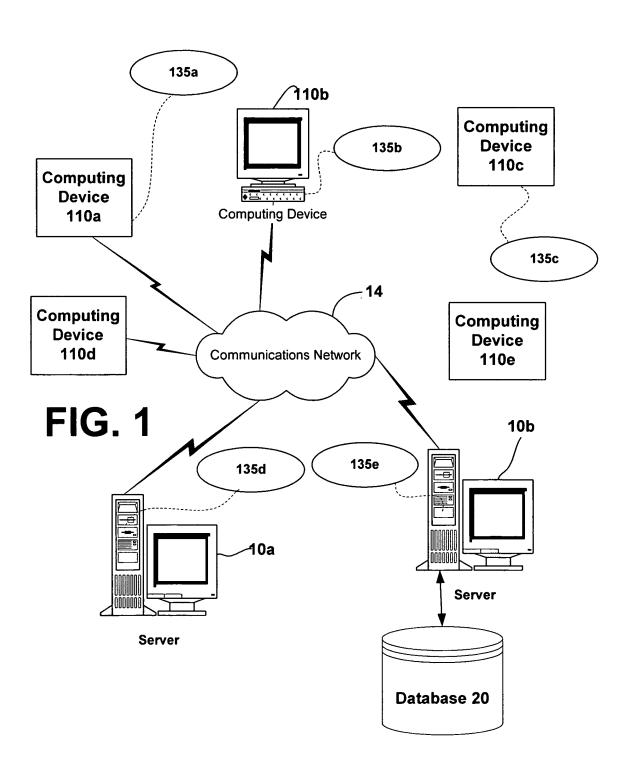
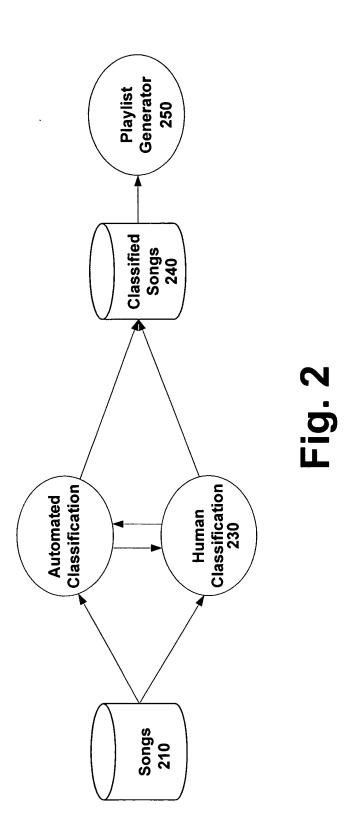
Docket No.: MSFT-0577/167506.2
Inventors: Jeffrey S. Hoekman, Christopher B. Weare
Filing Date: July 6, 2001 Serial No.: Not yet assigned
Title: System and Methods for Providing Automatic
Classification of Media Entities According to
Consonance Properties

Page 1 of 15



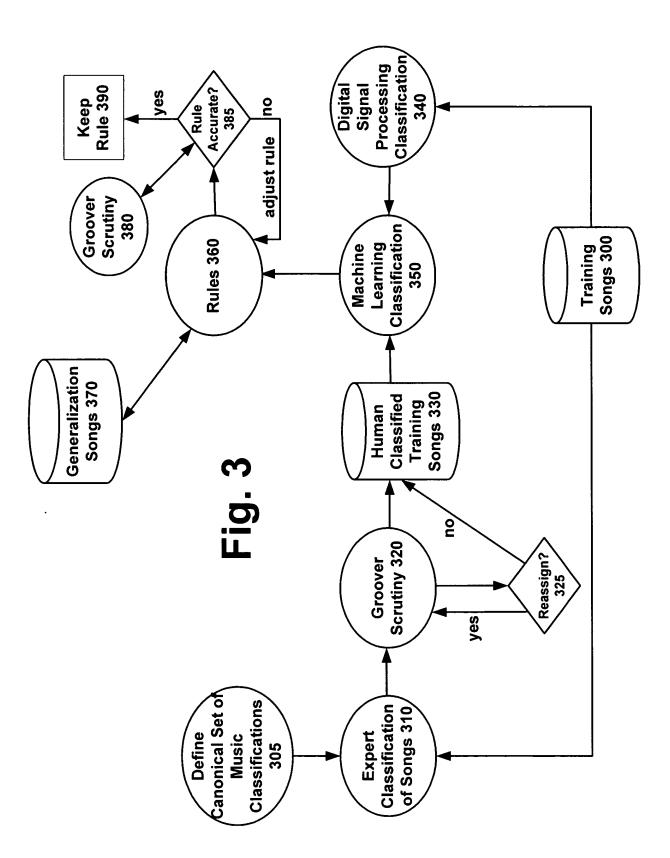
Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Automat Classification of Media Entities According to Consonance Properties

Page 2 of 15



Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Automatic Classification of Media Entities According to Consonance Properties

Page 3 of 15



Docket No.: MSFT-0577/167506.2

Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filips Date: July 6, 2001 Serial No.: Not yet assigned Times and Methods for Providing Automatic Classian of Media Entities According to Consonance Properties

Page 4 of 15

Fig. 4A

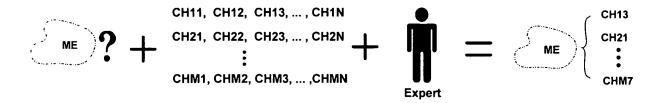


Fig. 4B

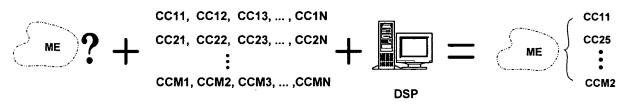
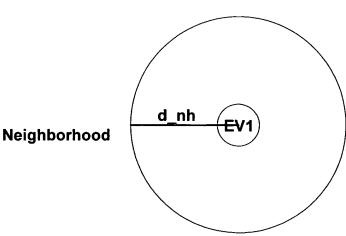


Fig. 4C



Fig. 4D



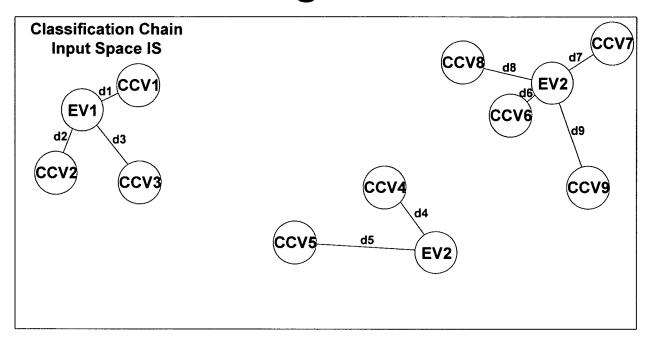
·Ci

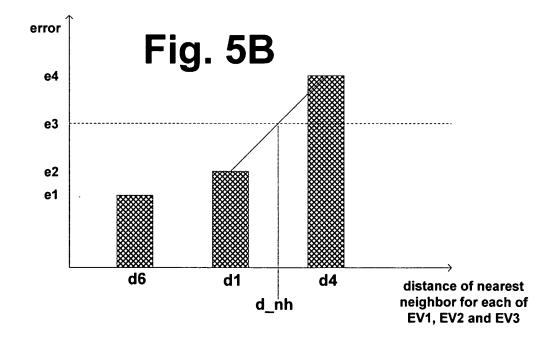
Docket No.: MSFT-0577/167506.2

Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Autom Classification of Media Entities According to Consonance Properties

Page 5 of 15

Fig. 5A



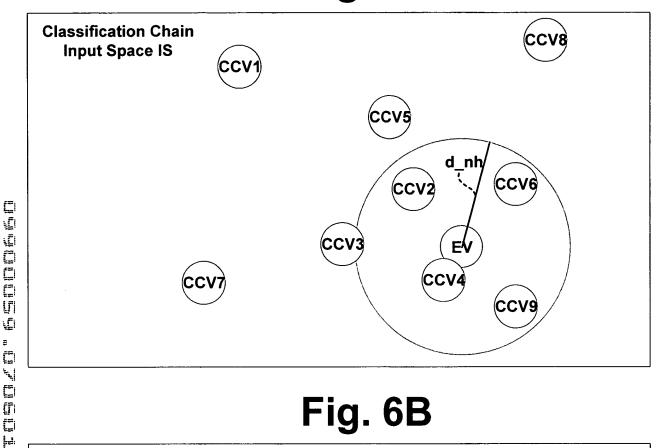


Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Au Classification of Media Entities According to

Consonance Properties

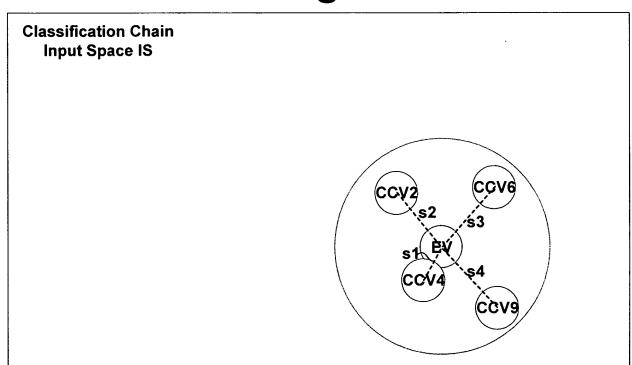
Page 6 of 15

Fig. 6A



8

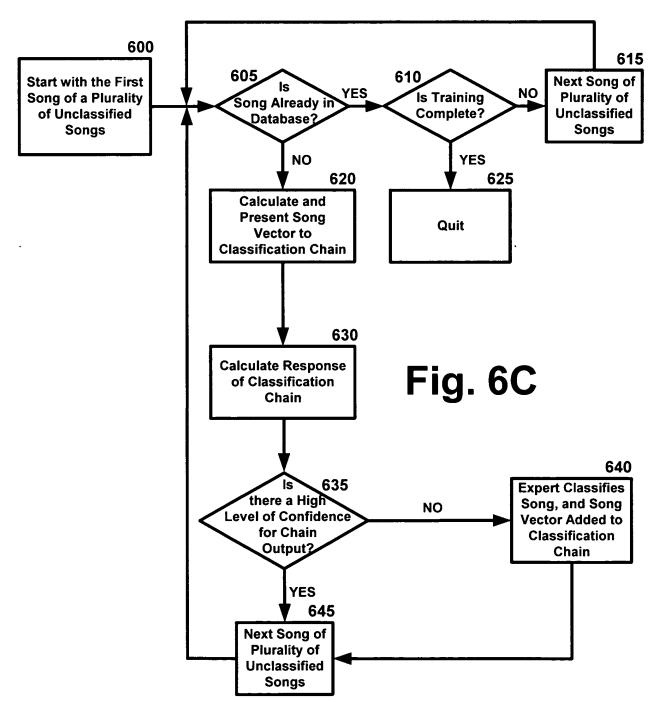
Fig. 6B



Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Auto

Classification of Media Entities According to Consonance Properties

Page 7 of 15

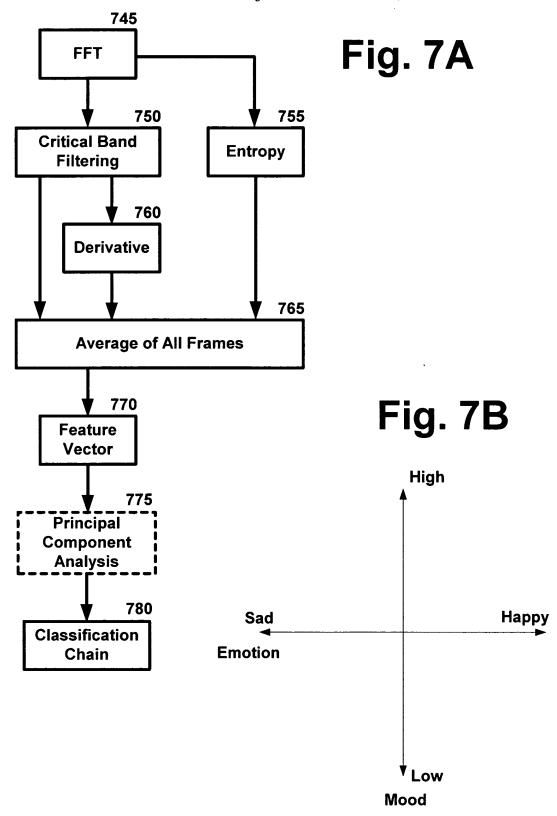


Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Autor

Classification of Media Entities According to

Consonance Properties

Page 8 of 15



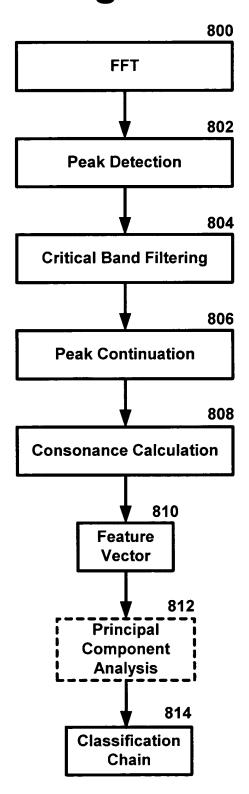
Docket No.: MSFT-0577/167506.2 Inventors: Jeffrey S. Hoekman, Christopher B. Weare

Filing Date: July 6, 2001 Serial No.: Not yet assigne Title: System and Methods for Providing Automa Classification of Media Entities According to

Consonance Properties

Page 9 of 15

Fig. 8A



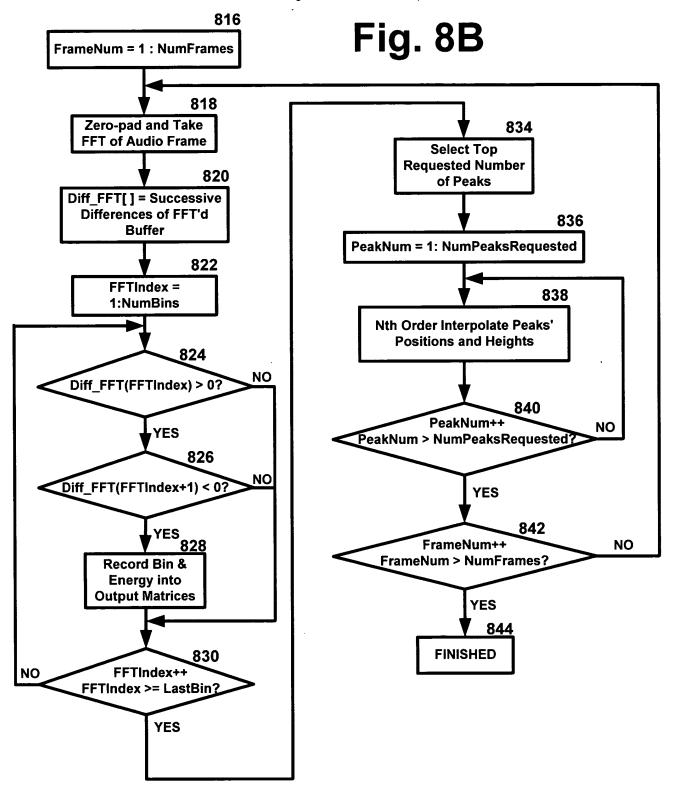
Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Automatic Classification of Media Entities According to

Consonance Properties

L.

5

Page 10 of 15



Classification of Med tities According to Consonance Properties 846 Page 11 of 15 Setup Guides Based on Peaks in First Frame 866 NO GuideMatch != 0 848 YES For FrameNum = 1: NumFrames 868 Record this Peak & Energy into Output Matrix 850 **Record Possible Missed Peak in** PeakMatched = [] Previous Frame if ThisGuide Just Started GuideMatch = 0 PeakMatched(PeakNum) = 1 GuideState(GuideNum) = kContinued GuideEnergy(GuideNum) = ThisEnergy 852 For PeakNum = 1:NumPeaks 870 PeakNum++ 854 PeakNum > NumPeaks? MinDiff = kNyquistFreq Matched = 0 YES ThisPeak = Bins(FrameNum, PeakNum) 872 ThisEnergy = Energies(FrameNum, PeakNum) **Locate & Record Unused Guides** and Unmatched Peaks 856 For GuideNum = 1:NumGuides 874 NO Any Unused Guides 858 or Unmatched Peaks? ThisGuide = GuideFreq(GuideNum) ThisGuideEnergy = GuideEnergy(GuideNum) YES 876 Start New Guides at the **Unmatched Peaks with Largest** 860 Energy If ((ThisPeak Is within 1/2 Step of ThisGuide) NO & (PeakEnergy is within 6dB of ThisGuideEnergy) & (ThisGuide 878 not Just Continued)) FrameNum++ FrameNum > NumFrames? YES 862 YES GuideMatch = GuideNum 879 (Record Matched Guide #) **FINISHED** 864 guideNum++ NO Fig. 8C (guideNum>numGuides)? YES

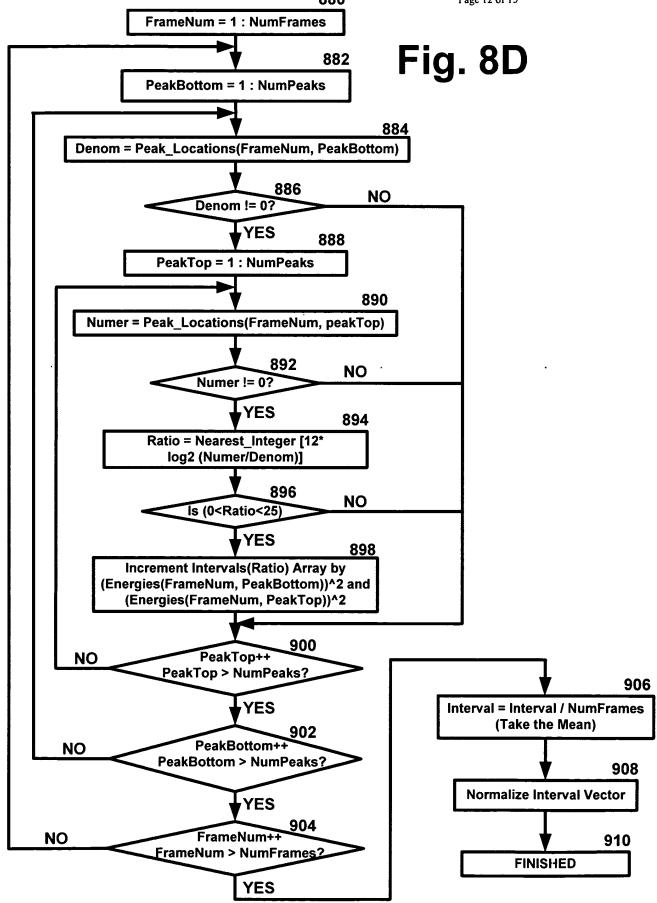
Docket No.: MSFT-0577/167506.2

Title: System and M

Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2000 Serial No.: Not yet assigned

for Providing Automatic

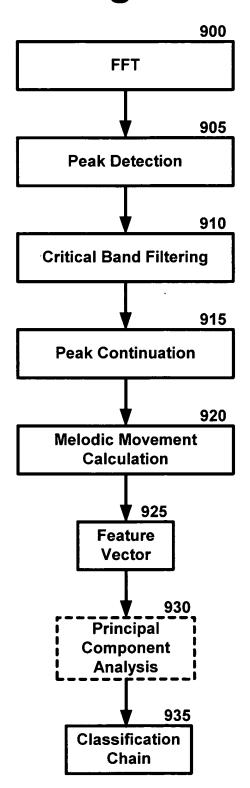
Docket No.: MSFT-0577/167506.2 Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: 6, 2001 Serial No.: Not yet assigned Methods for Providing Automatic Title: Sys Classificati Media Entities According to Consonance Properties 880 Page 12 of 15 Fig. 8D 882 884 NO 890 NO 894 NO 898



Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned Title: System and Methods for Providing Auto Classification of Media Entities According to Consonance Properties

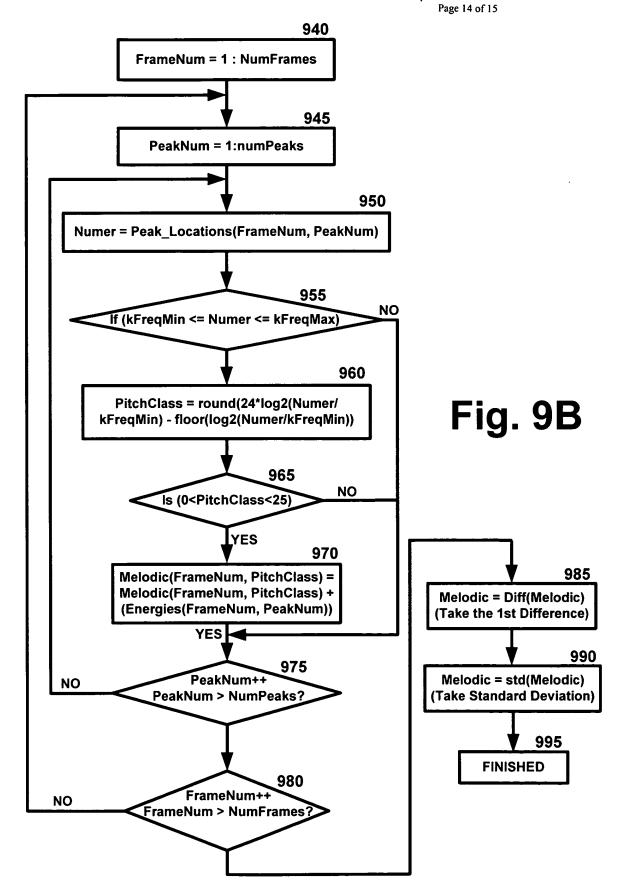
Page 13 of 15

Fig. 9A



Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: 12, 6, 2001 Serial No.: Not yet assigned Title: System Methods for Providing Automatic Classification Media Entities According to

Consonance Properties



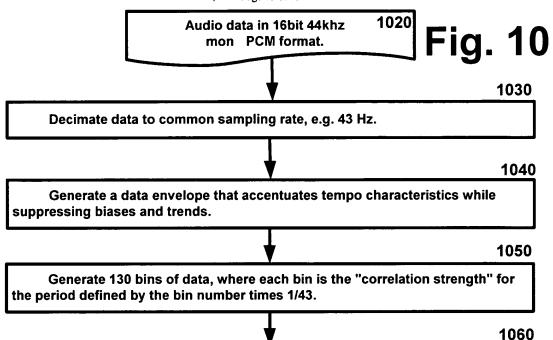
Inventors: Jeffrey S. Hoekman, Christopher B. Weare Filing Date: July 6, 2001 Serial No.: Not yet assigned

Title: System and Methods for Providing Automatic

Classification of Media Entities According to

Consonance Properties

Page 15 of 15



Feed into classification chain. For every calculated distance that is below a defined threshold, the corresponding classified tempo along with the distance is added to a table. The distance values in the table are translated into confidence values by taking 1/(distance^4). Each tempo value is divided by 10 and the log2 is taken. The integer portion is the "harmonic component" entry. The fractional portion is the "tempo component" entry.

1070

Tempo components are translated into vector representation. The range of 0 to 1 is mapped to 0 to 2pi. The sine and cosine of the angle are taken and multiplied by the corresponding confidence value. These sine and cosine components for the entire table are accumulated separately to create an overall representative vector. The angle of this vector is mapped back to a range of 0 to 1 to give an overall confidence of the tempo classification.

1080

The harmonic component of each table entry is evaluated. If the corresponding tempo component meets one of the following criteria, the harmonic is modified. If the tempo entry is less than the overall tempo classification - 0.5, the harmonic component entry is decremented. If the tempo entry is greater than the overall tempo classification + 0.5, the harmonic component is incremented. Each harmonic component table entry "votes" for its value with a weight proportional to the corresponding confidence value. The most prominent value is used as the overall harmonic component.

1090

The overall tempo is calculated by calculating 2^(overall harmonic component + overall tempo component) multiplied by 10.